Appendix

E

BIGHORN NATIONAL FOREST

Land and Resource Management Plan - DEIS

# Appendix E

# Research Natural Areas

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Appendix E

# Introduction

Adaptive management is one of the key principles of ecosystem management. Adaptive management recognizes that land and resource management decisions need to be made even though the knowledge for making the decision and their consequences may be incomplete or uncertain. Under adaptive management, managers decide the best course with available information but monitor to make sure the original decision is having the desired effect. Research Natural Areas (RNAs) are key components of adaptive management because they represent ecosystems in a natural condition. RNAs serve as reference areas that allow managers to assess consequences of management actions on other similar areas. Scientists use RNAs to understand how ecosystems function. RNAs are also important for conserving biological diversity.

The first Forest Service RNA was established in 1927 on the Coronado National Forest in Arizona. Since then, the RNA system has grown to over 420 established RNAs nationwide. Forest plans will propose additions to the RNA networks because of the essential role of RNAs in ecosystem management—providing reference areas and research opportunities and protecting biological diversity. Currently, there are two RNAs on the Bighorn National Forest.

### What RNAs Represent

The goal of the RNA program is to represent the ecological diversity that occurs on National Forest and National Grassland units so the Forest Service can assess the impacts of management and conserve biological diversity. An ecosystem can roughly be defined as the plants animals, and environment of a given area. Some of the major ecosystem types that help define this ecological diversity on the Bighorn National Forest include spruce/fir, lodgepole pine, and aspen forests; shrublands; montane grasslands; alpine areas; and aquatic and riparian ecosystems. At a finer scale, ecosystem types can be defined by several of their dominant plant species, such as subalpine fir/Engelmann spruce/grouse whortleberry and aspen/bracken fern types. At this level, ecosystem types are referred to as plant associations or community types. Over 500 plant associations and community types have been identified on national forests and grasslands in the Rocky Mountain region, and few of these are represented in RNAs.

RNAs can also represent the broad geographical differences in different ecosystem types within each Ecoregion Section (see hierarchy of Ecological Units). Variations in geology,

soils, landforms, and climate influence the kinds of plants and animals that live in different regions and can be used as features for establishing a representative RNA system. The differences that occur between granitic and sedimentary soil substrates affect plant communities, species occurrence, and other ecosystem components, and are typical of the kind of significant ecological differences that the RNA system tries to represent.

## The Function of RNAs

RNAs serve at least three important functions for the Forest Service:

1. Reference Areas: RNAs serve as benchmarks or references areas for monitoring and evaluating the sustainability and impacts of land management practices on lands with similar ecosystem types. To determine the impact of management on an area, it is desirable to have a similar area maintained in natural condition for comparison. RNAs make one of their most important contributions to ecosystem management serving as a representative system of controls for land managers.
2. Biological diversity: RNAs provide protection for biological diversity. A representative RNA system provides some degree of assurance that a wide array of plant and animal species are being given a high degree of protection for the future. This protection may be most important for the forms of biological diversity that ecosystems often depend upon the most and about which we know the least, such as soil microorganisms, fungi, and insects. RNAs can also be selected to provide a high degree of protection for specific populations of threatened, endangered, and/or sensitive species.
3. Research: RNAs provide sites for research into how ecosystems function. This research is often best accomplished in areas where ecological and evolutionary processes are functioning as naturally as possible. RNAs serve as sites for monitoring long-term change in ecosystems, such as global climate change and shifting patterns in the landscape resulting from natural disturbances by fire, floods, and insect epidemics. When scientists perform a variety of research projects in an identified RNA, the cumulative results of such work can greatly increase our understanding of particular ecosystems. One of the results of ecosystem management is that lands will be managed with the best information available. Over the years, scientific research in RNAs has helped provide that information. RNAs also serve an important educational function by providing excellent examples of ecosystems in relatively natural conditions with functioning ecological processes.

RNAs help the Forest Service maintain the long-term health, productivity, and diversity of lands entrusted to its management by the public.

## Condition of RNAs

Because RNAs represent ecosystems in their natural condition, they should be located in areas with a minimal amount of impact from human use. RNAs should also contain good

examples of the ecosystem types they represent. For some ecosystem types, areas without significant human impact could not be found. In these cases, RNAs were selected from sites in the best available condition. On the Bighorn National Forest, a concentrated effort was made to select sites that would have minimal conflicts with existing public uses. Therefore, potential RNAs were primarily selected from lands that are presently roadless and in vacant or closed grazing allotments.

## Size of RNAs

To serve as benchmarks, to conserve biological diversity, and to serve as research areas, RNAs must be large enough to maintain the natural processes that sustain ecosystems. For example, many of our forest, grassland, and shrubland ecosystems evolved from fire and other natural disturbances producing a landscape that is a mosaic of patches of various sizes and ages. These patches vary from tens to thousands of acres in size. To maintain ecological processes in many fire-dependent ecosystems, land areas of a thousand or more acres in size often work best to incorporate a mosaic of successional stages or to allow for their development in the future. Current ideas in conservation biology also recognize the potentially harmful influence of some outside land uses on the ecological integrity of small natural areas. Small natural areas can degrade easily and suffer species loss.

Larger natural areas provide greater representation for the range of natural variability, which occurs in most ecosystem types and makes RNAs potentially more valuable as benchmarks for ecosystem management. Some RNAs that represent these patterns and processes are desirable. Where possible, complete watersheds have been selected for potential RNAs, partially in order to maintain intact and naturally functioning aquatic and riparian ecosystems.

## Management of RNAs

Management area prescriptions provide an outline for how RNAs will be managed. The intent of RNA management is to minimize human impacts that will affect the ecosystem and to maintain biological diversity and natural processes. Therefore, most potential RNAs were selected from areas that are roadless, in vacant or closed grazing allotments or where grazing levels appear compatible with RNA designation, in areas that have not experienced timber harvesting, and in areas that do not experience heavy recreation use. Road building and timber harvesting are not compatible uses in RNAs. Some degree of livestock grazing can be used to maintain grassland ecosystems found on national grassland units.

## Recreation Management

Most of the potential RNAs on the Bighorn National Forest were selected in areas that do not receive heavy recreational use. However, it is inevitable that varying degrees of recreational use will occur in all these areas, and recreational use will likely increase. Because RNAs serve as benchmarks and heavy recreational use can alter species populations and affect ecosystem function, recreational use is not encouraged, but not

prohibited, in RNAs. For example, use of existing trails in RNAs is permitted, but no new trails will be constructed unless necessary to correct resource damage from existing trails. Existing recreation trails often provide desirable access to RNAs for research, administrative, and educational purposes.

### Fire Management

Natural fire frequencies and intensities are desirable in RNAs. However, excessive build-up of fuels from decades of fire suppression, valuable resources outside RNA boundaries, and special values inside some RNAs, may preclude allowing prescribed natural fires to occur. Site-specific fire management plans may need to be developed for the potential RNAs in order to identify circumstances during which natural fires can be allowed to burn freely and to design specific management ignited prescribed fires to mimic natural fires.

### Exotic Species Management

Exotic (non-native) species are not desirable in RNAs. Some particularly invasive and unpalatable plant species, such as knapweed and Canada thistle, could be targets for control in RNAs and elsewhere on public and private lands. Decisions on the threats of exotic plant species to RNA values and possible control techniques, including the use of herbicides, will need to be made on a site-specific basis.

## Potential RNAs

Short summaries for each of the potential RNAs (pRNA) are presented below. Complete descriptions of each area were written, based on Ecological Evaluations developed by the Wyoming Natural Diversity Database (WNDD), and validated by Bighorn National Forest personnel familiar with on-the-ground conditions. These complete descriptions are part of the administrative record on file and available for review at the Forest Service Office in Sheridan, Wyoming. These eleven areas were inventoried for potential inclusion in the draft Revised Forest Plan; however, only four of the following potential RNAs--Lake McClain, Mann Creek, Leigh Canyon, and Pheasant Creek--were included in alternatives analyzed in detail.

The following table summarizes a few characteristics of each pRNA. The ecological evaluations are 30 to 50 pages long, and contain detailed information about each pRNA. The ecological evaluations are available at the Forest Service office in Sheridan.

| pRNA | Acres | Major Cover Types[1] | Soil Substrate | Quality | Condition | Viability | Defensibility |
|---|---|---|---|---|---|---|---|
| Lake McClain | 8250 (2300 non-Wild) | Alpine, LP, SF | Granite | Variety of upper subalpine and alpine ecosystems. | Little alteration from pre-settlement conditions. | Baby Wagon meadow is human access point; little influence now. | 4-wheel drive access to south end; snowmobile trail through SW corner. |
| Leigh Canyon[2] | <1500 | DF, CW, Shrub/Sage | Sedimentary | Types are not represented in RNAs | Leigh: largely pristine<br>Tensleep: Impacted | Leigh: likely to remain viable | Leigh: Highly defensible<br>Almost inaccessible |
| Mann Creek | <7500 | DF, G, PP, LiP, Shrub | Sedimentary | Good representation of limestone canyon habitats. | Exotics present, major in only a few mesic grass. Needs fire | No immediate threats noted. Will need fire. Trout protection | Steep rough terrain, little access. |
| Pheasant Creek | 9090 | LP | Granite (<10% Sediment) | Large and least impacted LP/vaccinium type. Very homogeneous, may not define range. | Good: Difficult access and minimal human impacts. | LP seral to SF? Natural processes appear intact. | Difficult access, Impacts primarily along trails. |
| Pete's Hole | 2770 | SF, Sage, DF, LiP | 80%+ Sedimentary <20% Granite | Types are variable and not represented in RNAs | Exotics/human impacts in meadows | Forests stable, grasslands impacted | Relatively defensible, difficult access. |

[1] LP: Lodgepole Pine SF: Spruce/fir DF: Douglas-fir G: Grass Sage: Sagebrush LiP: Limber Pine
Jusc: Rocky Mountain Juniper PP: Ponderosa pine As: Aspen CW: Narrowleaf Cottonwood

[2] Ecological evaluation is labeled as "Tensleep Canyon". However, Tensleep Canyon itself is not suitable, due to highway, old highway, exotics, cattle trailing.

| pRNA | Acres | Major Cover Types[1] | Soil Substrate | Quality | Condition | Viability | Defensibility |
|---|---|---|---|---|---|---|---|
| Dry Fork | 10,190 | DF, G, Sage, LiP | Sedimentary | Wide variety of ecosystem types: forest, grass, shrub. | Many types have exotics present; timothy up to 15% in grass/shrub. | DF "stable seral", so may persist. Exotics may lead to change. | Most of area "easily protected." |
| Elephant Head | 9660 | G, SF, Sage, Jusc, CW | Sedimentary | Wide variety: ES, DF, Jusc, shrub, grass | Exotics, sometimes dominant, along Trail | Exotics may continue to increase | Cliffs secure; Beef Trail may be indefensible. |
| Devil's Canyon | <6000 | SF, DF, LiP, As, G, Sage | 75% Sedimentary, 25% Granite | Wide variety of ecosystem types. | Most is "remarkably undisturbed." Trail. | Med. Wheel NHL boundary may affect south portion. | Canyon good, south end poor. |
| Tongue River | 5660 | DF, G, PP, CW, LiP | 80% Sedimentary, 20% Granite | DF, PP, some shrubs and grass | 7% of pRNA impacted by exotics; trails | Heavy human use and evidence of past use. | With trails, probably indefensible. |
| Crazy Woman | 1580 | LP, PP, CW, Shrub | 50% each | Types quite variable, not in RNAs | Slopes good; riparian bottom is poor | Fire needed in PP. | Road in bottom bisects area, not defensible. |
| Poison Creek | 2330 | LP, G, As | 85% Granite, 15% Sedimentary | Good LP/vaccinium community | Poor: high evidence of human uses | Poor: Exotic species, roads, grazing, logging | "Poorly suited for research" |